

Cost Management Strategy of Highway Engineering Construction Stage Using the List Pricing Model

Zhenghong Peng*

China Merchants Chongqing Communications Technology Research & Design Institute Co., LTD., Chongqing 400067, China

*Corresponding author: Zhenghong Peng, 32554055@qq.com

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Abstract: Highway engineering requires higher investment and requires a long time of management compared to other construction projects. There are many factors that affect the project cost during the engineering construction stage of a highway. The effective development of cost management in the construction phase of highway engineering under the list pricing model can avoid unnecessary waste and help control the cost of highway engineering. However, there are still some problems in the development of cost management in the construction phase of highway engineering, which will affect the role of the list-based pricing mode in cost management. This paper explores and analyzes the advantages of the list pricing model and the problems existing in the cost management of the highway engineering construction stage under the list pricing model, and proposes effective management strategies to improve cost management of the highway engineering construction stage.

Keywords: List pricing model; Highway engineering; Construction stage; Cost management

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1. Introduction

The list pricing model has many advantages over the quota pricing model. It can not only share risks, but also regulate the bidding behavior, and can also improve the transparency of bidding, which helps to enhance the competitiveness of enterprises. The value of the list pricing model needs to be fully maximized in the cost management of highway projects, and existing cost management problems need to be identified and analyzed, so as to further optimize and improve the cost management, and then effectively control the cost of highway engineering.

2. Advantages of the list pricing model

(1) It helps to share the risks

In the process of bidding for highway projects, the tenderer needs to accurately calculate the project volume according to the project volume and the calculation rules of the list pricing specification, and bear the corresponding risks. Bidders need to comprehensively analyze the cost, economic benefits and risks of the highway project. The next step is to carefully and reasonably formulate construction plan which includes determining the configuration of staff, construction materials and construction tools, further optimizing the construction plan, strictly controlling the cost of the construction site, and finally setting the bidding price of the highway project. At the same time, it is also necessary to bear the corresponding quotation risk, which is conducive to the reasonable sharing of risks.

(2) It contributes to the norms of bidding behavior

With the list-based pricing model, the market and enterprises once again enjoy pricing power when carrying out bidding for highway projects, and the mandatory role of the quota is weakened, which greatly reduces the intervention of relevant government departments, and increases the “inquiry” when conducting bidding. In this way, errors, duplicates and missed quotations can be detected in a timely manner, which is more conducive to the regulation of market order, and change the old habit of only focusing on the total bid price and ignoring the actual price. In the process of bid evaluation, the bid price is measured through the formulation of basic standards, and the bill of quantities is added to the highway engineering bidding documents, which not only regulates the bidder's pricing behavior, but also avoids the occurrence of black box operations and fraudulent behaviors.

(3) It helps to improve the transparency of bidding

In the past, there were many drawbacks in the auctions of highway projects, and corruption occurred frequently. Although some auctions have set up registration, review, bid opening and bid evaluation, etc., it is still inevitable that there will be bad behaviors such as escorting bids, colluding bids and privately selling bottom bids. In order to win the bid, some bidders bribe the judges and owners, or create false bidding documents, certificates and materials.

The development of an auction using the list pricing model can prevent the occurrence of these behaviors and helps improve the transparency of bidding. Under the list valuation mode, the highway engineering quantity of the bidder is unified, which provides an important basis for the development of bid evaluation. Moreover, under the list pricing model, the market actually has the right to determine the price, and the role of the base number of a tender is weakened. In this way, the leaking of the base price of a tender can be prevented, which greatly improves the transparency of bidding.

3. Problems in cost management in construction stage of highway engineering under list pricing model

(1) Problems in the bill of quantities

The problems existing in the bill of quantities of highway works are reflected in the following: Firstly, the bidding unit adopts the engineering quantities of similar highway projects in order to save a certain amount of labor when compiling the bidding documents. Secondly, the bidding unit first calculates the rated engineering quantity, and then divides the engineering quantity with the help of calculation software, which is prone to the problem of lack of accuracy of the engineering quantity list ^[1]. Besides, the functionality of some bill of quantities compilers needs to be further improved because they are not able to compile bills of quantities with high complexity independently.

(2) Problems with corporate quotas

The list pricing model is designed to break the limitation of unified pricing by the relevant government departments in the past, so that the construction unit can give full play to its advantages in technology and price, thereby creating more benefits. However, some construction units have not established a relatively complete quota standard. The list pricing model can be formalized more easily.

(3) Problems in evaluating bids

The cost management work in the construction phase of highway engineering usually lacks a quotation clarification mechanism while using the list pricing model. This limits the full play of the role of pretender and affect the formation of the bid evaluation committee, causing the accuracy of the bid evaluation results to not be guaranteed.

(4) Problems in the contract

In order to resolve the problems in highway engineering cost and construction, necessary clarification and restriction needs to be made during the signing of corresponding contracts ^[2]. According to the requirements of relevant laws and regulations in China, highway engineering construction units need to track the list price prepared by the cost management department, and, supervise and manage the specific implementation of the contract. However, the audit of the actual implementation of contract regulations by various departments is not systematic, which leads to some problems in the process of contract implementation.

(5) Problems in construction

The development of cost management in the construction phase of highway engineering under the list pricing model is easily affected by human factors and external factors, which can easily lead to some property losses. Therefore, the contractor faces many risks, such as project management risk, quotation error risk, and so on ^[3].

4. Effective strategies for cost management in the construction stage of highway engineering under the mode of list pricing

(1) Engineering change management in the list pricing model

Engineering change refers to the change of some or all of the construction methods, technical indicators, engineering functions, construction materials, etc. according to the content of the contract during the construction of the project ^[4]. Engineering change management mainly involves two aspects, one is the engineering quantity, and the other is the comprehensive unit price. Among them, the management of the project quantity includes the determination of the project quantity and the on-site visa. The change of the project quantity is very important, so both the owner and the contractor attach great importance to the change of the project quantity, but it is often easy to ignore the comprehensive unit price change. Comprehensive unit price change will definitely have a greater impact on the cost of highway engineering ^[5] thus also deserves more attention. Based on the list pricing model, if there is a unit price that is more suitable for the change project in the bill of quantities, it needs to be executed according to the existing comprehensive unit price in the list. After conversion, the consolidated unit price after the change will be confirmed. If the applicable unit price for engineering change is not set in the bill of quantities, the contractor and the construction unit shall jointly negotiate on the comprehensive unit price for engineering change. In case of disagreement between the two parties, the final determination can be made according to the dispute provisions in the contract or by the project supervisor ^[6]. When implementing the unbalanced highway engineering quotation, the contractor often tries to benefit themselves, and the construction unit will try to reduce the adverse impact of the unbalanced cost. At this time, both the contractor and the construction unit will use the engineering change to explore opportunities that are beneficial to themselves. If the contractor applies the unbalanced quotation when bidding, and when the contract is signed, the unbalanced unit price is not adjusted, then it needs to be dealt with in accordance with the relevant regulations ^[7].

(2) Claims management of highway engineering based on the list pricing model

The execution highway engineering needs to be in accordance with the contract and relevant laws and regulations of the country. If one party faces losses because the other party fails to adhere to the contract, the losing party can request for a compensation ^[8]. At this stage, the construction claims in our country are usually made by the contractor. The procedure of claim is as follows: Firstly, if one party submits a notice of claim, the contractor needs to issue a notice of claim within the corresponding time in accordance with the contract ^[9]. Secondly, the relevant documents for the claim should be submitted. In the event of a project claim, the contractor needs to prepare relevant documents in a timely manner, and submit the documents to the engineer within 28 days after the notice of claim is issued, or within the

time period after negotiating and achieving an agreement with the with the engineer. The amount of the claim needs to be clearly stated in the information and the basis for filing the claim also needs to be provided. The third step of the process is processing the information of the claim. If the information submitted by the contractor is sufficient to prompt the engineer to determine the amount to be paid, then the engineer shall pay the certified claim amount in the month in which the claim information is received. If the contractor is not satisfied with the engineer's decision to deal with the claim, the following responses need to be made: The first step is sending the engineer a notice of intent to continue to reserve the right to claim ^[10]; secondly, after the completion of the handover of the engineering certificate, further claims can be made after the submission of the completion statement. The last step is to negotiate within the agreed time according to the contract, and if it still cannot be resolved, it can be submitted to arbitration.

- (3) Improve the professional abilities and professional qualities of highway engineering supervisors
The professional abilities and professional qualities of the supervisors must meet the needs of their jobs. Only in this way can the construction progress smoothly, and the construction safety, various construction phases and construction quality be strictly controlled. At the same time, the supervisors also need to meticulously inspect the manpower, construction materials, and construction equipment invested by the contractor in the highway project, and make records at the same time ^[11]. The supervisors also need to review the relevant declaration materials submitted by the contractor for the progress payment of the highway project. It is also necessary to review the project change fee and the number of visas submitted by the road project contractor ^[12]. At the same time, it is also necessary to sort out the measurement data and payment data of highway engineering changes in accordance with the corresponding procedures. In addition, the supervisors also need to collect all the original materials generated during the construction phase of the highway project for subsequent use.
- (4) Strengthen risk management
More financial, material and human resources are required to be invested in the construction of highway projects. If all parties involved in highway engineering construction do not pay enough attention to risk management, it will greatly increase the probability of risk occurrence, and may also cause greater losses ^[13]. At the least, it may lead to delays in the construction period of highway projects, resulting in the actual expenditure of all parties involved in the construction of highway projects exceeding the budget. And at the worst, it may be difficult to continue the construction of the entire highway project, resulting in irreparable investment. If all parties involved in project construction attach great importance to risk management, even when risks occur, there will be no mutual shirk, but an accurate response will be made in the first time, so as to reduce the losses caused by risks ^[14]. Based on the list pricing model, the owner is responsible for the risks caused by the project quantity in the bill of quantities, and the construction party is responsible for the risks caused by the unit price of the project in the bill of quantities. Risk management personnel of all parties involved in highway engineering need to conduct comprehensive collection, investigation and research on highway engineering data, and objectively judge the various risks hidden in highway engineering, establish risk identification awareness, and target them on this basis, so as to develop a detailed response plan in advance ^[15]. It should be noted that the identifiable factors that can cause risks need to be confirmed as soon as possible, and uncertain factors that will lead to risks cannot be blindly excluded, but decisions need to be made through careful research and analysis to avoid unnecessary impact on the cost management of highway projects.

5. Conclusion

in conclusion, highway engineering plays a very important role in China's economic development. In recent years, the volume of highway engineering has increased, and the control of highway engineering cost has

garnered more and more attention. In the process of highway engineering cost management under the list pricing model, it is necessary to strengthen the management of highway engineering changes, claims and risks. At the same time, it is necessary to focus on improving the professional abilities and professional qualities of highway engineering supervisors, so as to ensure the efficiency and the quality of highway engineering construction. Moreover, potential risks should be prevented, and the cost of highway engineering should be controlled, so as to realize the improvement of economic and social benefits of highway engineering, and improve the process of highway engineering construction.

Disclosure statement

The author declares no conflict of interest.

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